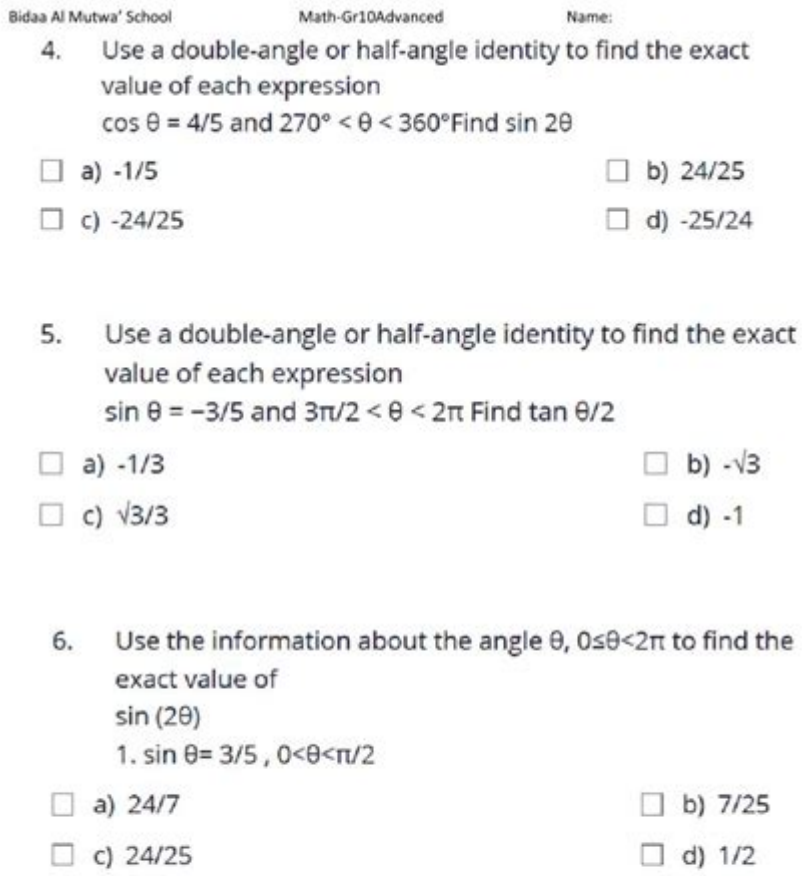
Double Angle Identities Worksheet With Answers



Bidaa Al Mutwa' School Math-Gr10Advanced Name:

4. Use a double-angle or half-angle identity to find the exact value of each expression
cos θ = 4/5 and 270° < θ < 360°Find sin 2θ

☐ a) -1/5 ☐ b) 24/25

☐ c) -24/25 ☐ d) -25/24

5. Use a double-angle or half-angle identity to find the exact value of each expression
sin θ = −3/5 and 3π/2 < θ < 2π Find tan θ/2

☐ a) -1/3 ☐ b) -√3

☐ c) √3/3 ☐ d) -1

6. Use the information about the angle θ, 0≤θ<2π to find the exact value of
sin (2θ)
1. sin θ= 3/5 , 0<θ<π/2

☐ a) 24/7 ☐ b) 7/25

☐ c) 24/25 ☐ d) 1/2

Double angle identities worksheet with answers is an essential tool for students and educators alike who are delving into the fascinating world of trigonometry. Understanding double angle identities not only deepens your grasp of trigonometric functions but also enhances your problem-solving skills. This article will explore the importance of double angle identities, provide a comprehensive worksheet with answers, and suggest practice problems to reinforce your understanding.

Understanding Double Angle Identities

Double angle identities are formulas that express trigonometric functions of double angles (2θ) in

terms of trigonometric functions of single angles (θ). These identities are essential in simplifying expressions, solving equations, and proving other identities in trigonometry. The three primary double angle identities are:

- **Sin Double Angle Identity:** $\sin(2\theta) = 2\sin(\theta)\cos(\theta)$
- **Cos Double Angle Identity:** $\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$ or $\cos(2\theta) = 2\cos^2(\theta) - 1$ or $\cos(2\theta) = 1 - 2\sin^2(\theta)$
- **Tan Double Angle Identity:** $\tan(2\theta) = \frac{2\tan(\theta)}{1 - \tan^2(\theta)}$

These identities are derived from the sine and cosine addition formulas and play a crucial role in various applications in mathematics and physics.

The Importance of a Double Angle Identities Worksheet

A **double angle identities worksheet with answers** serves multiple purposes in the learning process:

1. Practice and Reinforcement: Worksheets provide students with the opportunity to practice applying double angle identities in various contexts.

2. Assessment: Worksheets can be used by educators to assess student understanding and identify areas needing improvement.

3. Resource for Review: Students can use these worksheets for review before exams or quizzes, ensuring they are well-prepared.

4. Problem-Solving Skills: Working through problems helps develop critical thinking and problem-solving skills essential for higher mathematics.

Sample Double Angle Identities Worksheet

Below is a sample worksheet that includes a variety of problems involving double angle identities. After the problems, answers are provided for self-assessment.

Worksheet Problems

1. Simplify the expression using double angle identities:
$$
\sin(2\theta) + \cos(2\theta)
$$

2. Find $\sin(2\theta)$ if $\sin(\theta) = \frac{3}{5}$.

3. Prove the identity:
$$
\cos(2\theta) = 1 - 2\sin^2(\theta)
$$

4. If $\tan(\theta) = 2$, find $\tan(2\theta)$.

5. Simplify the expression:
$$
2\cos^2(\theta) - 1 + \sin(2\theta)
$$

6. If $\cos(\theta) = \frac{4}{5}$, find $\cos(2\theta)$.

Answers to the Worksheet

1. Answer:
$$
\sin(2\theta) + \cos(2\theta) = 2\sin(\theta)\cos(\theta) + (\cos^2(\theta) - \sin^2(\theta))
$$

2. Answer:
Using the Pythagorean identity, $\cos(\theta) = \sqrt{1 - \sin^2(\theta)} = \sqrt{1 - \left(\frac{3}{5}\right)^2} = \frac{4}{5}$.
Therefore,
$$
\sin(2\theta) = 2\sin(\theta)\cos(\theta) = 2 \cdot \frac{3}{5} \cdot \frac{4}{5} = \frac{24}{25}.
$$

3. Answer:
Start with the left side:
$$
\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta) = 1 - \sin^2(\theta) - \sin^2(\theta) = 1 - 2\sin^2(\theta).
$$

4. Answer:
$$
\tan(2\theta) = \frac{2\tan(\theta)}{1 - \tan^2(\theta)} = \frac{2 \cdot 2}{1 - 2^2} = \frac{4}{1 - 4} = -\frac{4}{3}.
$$

5. Answer:
$$
2\cos^2(\theta) - 1 + \sin(2\theta) = 2(1 - \sin^2(\theta)) - 1 + 2\sin(\theta)\cos(\theta) = 1 - 2\sin^2(\theta) + 2\sin(\theta)\sqrt{1 - \sin^2(\theta)}.
$$

6. Answer:
$$
\cos(2\theta) = 2\cos^2(\theta) - 1 = 2\left(\frac{4}{5}\right)^2 - 1 = 2\left(\frac{16}{25}\right) - 1 = \frac{32}{25} - 1 = \frac{7}{25}.
$$

Additional Practice Problems

To further enhance your skills, try solving these additional practice problems:

1. If $\sin(\theta) = \frac{1}{2}$, find $\sin(2\theta)$ and $\cos(2\theta)$.

2. Prove the identity:
$$
\sin(2\theta) = 2\sin(\theta)\cos(\theta).
$$

3. If $\tan(\theta) = -\frac{1}{\sqrt{3}}$, find $\tan(2\theta)$.

4. Simplify:
$$
2\sin^2(\theta) + 2\cos^2(\theta).
$$

5. If $\sin(\theta) = -\frac{5}{13}$, find $\cos(2\theta)$.

Conclusion

A **double angle identities worksheet with answers** is a valuable resource for mastering trigonometric concepts. By practicing with these identities, students can strengthen their mathematical foundations, enhance their problem-solving abilities, and prepare effectively for assessments. Remember, the key to success in trigonometry lies in consistent practice and a clear understanding of the foundational concepts. Use this worksheet and additional practice problems to bolster your knowledge and confidence in this critical area of mathematics.

Frequently Asked Questions

What are double angle identities in trigonometry?

Double angle identities are formulas that express trigonometric functions of double angles (2θ) in terms of functions of single angles (θ).

What is the double angle identity for sine?

The double angle identity for sine is $\sin(2\theta) = 2\sin(\theta)\cos(\theta)$.

What is the double angle identity for cosine?

The double angle identity for cosine has three forms: $\cos(2\theta) = \cos^2(\theta) - \sin^2(\theta)$, $\cos(2\theta) = 2\cos^2(\theta) - 1$, and $\cos(2\theta) = 1 - 2\sin^2(\theta)$.

How can I solve problems using a double angle identities worksheet?

You can solve problems by applying the double angle identities to simplify expressions or solve equations involving trigonometric functions of double angles.

Where can I find a double angle identities worksheet with answers?

Double angle identities worksheets with answers can be found on educational websites, math resources, or by searching for printable worksheets online.

What type of problems are typically included in a double angle identities worksheet?

Problems typically include simplifying trigonometric expressions, solving equations, and finding exact values of trigonometric functions at specific angles.

Can double angle identities be applied to tangent?

Yes, the double angle identity for tangent is $\tan(2\theta) = 2\tan(\theta) / (1 - \tan^2(\theta))$.

How can double angle identities help in solving trigonometric equations?

Double angle identities can simplify trigonometric equations, making them easier to solve by reducing the degree of the angle involved.

Are there any common mistakes when using double angle identities?

Common mistakes include applying the identities incorrectly, forgetting to square terms, or miscalculating values when substituting angles.

What resources can assist in mastering double angle identities?

Resources such as textbooks, online tutorials, practice worksheets, and instructional videos can help in mastering double angle identities.

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Double Angle Identities Worksheet With Answers

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C语言中，float和double都属于浮点数。区别在于：double所表示的范围，整数部分范围大于float，小数部分，精度也高于float。举个例子：圆周率3.1415926535 这个数字，如果用float …

*C语言中，double**和double (*) [5]有什么区别？怎么理解？ - 知乎*

Nov 24, 2019 · double** 是指向 double* 类型的指针类型。区别不是很显然的吗？ double [5] 类型能隐式转换成 double* 类型，但它们不是同一类型。可以考虑一下 short 和 long 这两种类型 …

double是什么数据类型？它有什么作用？_百度知道

常见的数据类型有int float double 可以这么理解int是整型（整数） float是浮点型（小数）他的精度要比int高 double是双精度（精度更高的小数，约小数点后10位）比float要更高些，用来表示 …

为什么double类型输入（scanf）用%lf，输出（printf）用%f?

Feb 7, 2017 · 那么double有8字节空间，比4字节还大，能不能来放？答案是不能。因为float和double的关系不像int和long的关系那样，简单的在后面增加4字节的位置。float和double有自 …

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The long double function prototypes are identical to the prototypes for their double counterparts, except that the longdouble data type replaces the double data type. The long double versions …

英雄联盟里，一杀，二杀，三杀，四杀，五杀，团灭，说的英语是 ...

一杀：You have slain an enemy. 你击杀了一名敌人。双杀：Double Kill 三杀：Triple Kill 四杀：Quadra Kill 五杀：Penta Kill 团灭：Ace 《英雄联盟》（简称LOL)是由美国拳头游戏 (Riot …

double triple quatra penta hexa....一直到10怎么说？谢谢~

“double triple quatra penta hexa....”这些都是英文的倍数的固有写法，从double一直到10倍的写法如下： 2倍double、3倍triple、4倍quatra、5倍penta、6倍hexa、7倍hepta、8倍octa、9 …

单精度与双精度是什么意思，有什么区别？ - 知乎

含义：表明单精度和双精度精确的范围不一样，单精度，也即float，一般在计算机中存储占用4字节，也32位，有效位数为7位；双精度（double）在计算机中存储占用8字节，64位，有效位数 …

“King size”、“Queen size”的床分别是指多大？_百度知道

双人床：欧美床的尺寸一般是用英寸为单位的，具体尺寸还有以下两种： DOUBLE SIZE:74X54 (英寸)=188X137 (厘米) TWIN SIZE:74X39 (英寸)=188X99 (厘米) King size比Queen size宽 …

SPDT、DPDT和2个SPDT分别是什么意思？_百度知道

1. SPDT：全称是Single Pole Double Throw，中文名称为单刀双掷开关。2. DPDT：全称是Double Pole Double Throw，中文名称为双刀双掷开关。3. 2个SPDT：2个Single Pole Double …

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